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in which : "{Zn}", "{H₃PO₄}", and "{HNO₃}" respectively represent the zinc, phosphoric acid, and nitric acid concentrations in mol/L; each of C₀ and A₀ is zero; each p₀ and q₀ is 1; if m is not zero for each positive integer j from 1 to m, C_j represents the concentration in mol/L of the jth distinct cation species other than zinc present in the bath and p_j represents the cationic valence of said jth distinct cation species; and if n is not zero, for each positive integer j from 1 to n, A_j represents the concentration in mol/L of the jth distinct anion species other than anions derivable by ionization of phosphoric or nitric acids present in the bath and q_j represents the anionic valence of said jth distinct anion species, wherein $\{Zn\}/\{H_3PO_4\} < 0.91$.

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Please add the following new claims:

22. (New) The liquid composition of claim 12, wherein:
- the phosphoric acid concentration is from 0.20 to 0.60 mol/L;
 - the nitric acid concentration is from 0.30 to 1.0 mol/L
23. (New) The liquid composition of claim 1, wherein:
- the phosphoric acid concentration is from 0.25 to 0.60 mol/L;
 - the nitric acid concentration is from 0.30 to 1.0 mol/L.

REMARKS

Claims 1-21 are currently pending in the above-captioned matter. By this amendment, claims 2-5 have been cancelled, claims 1 and 12 have been amended, and claims 22-23 have been added. After entry of this amendment claims 1, and 6-23 are pending, claims 1, 12 and 14 being independent. Support for the amendments is found in claims 2 and 3, and throughout the specification, in particular at page 4, lines 33-37. Remarks made herein are based on the claims as amended hereby.

Claims 1-21 have been rejected under 35 USC §103 as being unpatentable over U.S. Patent No. 5,703,733 to Speckmann et al. (the '733 patent). Speckmann does not render claims 1 and 12, as amended, or claim 14 obvious where the ranges of zinc

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concentration taught by the '733 patent do not overlap the claimed ranges. In claim 14 the at least 0.20 mol/L dissolved phosphoric acid, at least 0.20 mol/L dissolved nitric acid in the following mathematical conditions:

$$\{Zn\} \leq 0.3 \{H_3PO_4\} + 0.5 \{HNO_3\} - 0.5 \sum_{i=0}^m p_i C_i + 0.5 \sum_{j=0}^n q_j A_j; \text{ and}$$

$$\{Zn\} \geq 0.27 \{H_3PO_4\} + 0.45 \{HNO_3\} - 0.45 \sum_{i=0}^m p_i C_i + 0.45 \sum_{j=0}^n q_j A_j.$$

provide a {Zn} of greater than or equal to 0.144 mol/L (9.4 g/L), which is well outside the range taught by the '733 patent. Likewise, similar calculations for amended claims 1 and 12 show no overlap of ranges.

Furthermore, there is no teaching or suggestion to modify the '733 patent to achieve Applicants' invention. In order to support a rejection under 35 U.S.C. §103, the Office must establish that there must be some suggestion, either in the reference or in the relevant art, of how to modify what is disclosed to arrive at the claimed invention. In addition, "[s]omething in the prior art as a whole must suggest the desirability, and, thus, the obviousness, of making" the modification to the art suggested by the Examiner. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 U.S.P.Q. 2d (BNA) 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988). That is, although the Office may suggest that the teachings of a primary reference could be modified to arrive at the claimed subject matter, the modification is not obvious unless the prior art also suggests the desirability of such modification. In re Laskowski, 871 F.2d 115, 117, 10

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U.S.P.Q.2d (BNA) 1397, 1398 (Fed. Cir. 1989). There must be a teaching in the prior art for the proposed combination or modification to be proper. In re Newell, 891 F.2d 899, 13 U.S.P.Q.2d (BNA) 1248 (Fed. Cir. 1989). If the prior art fails to provide this necessary teaching, suggestion, or incentive supporting the Examiner's suggested modification, the rejection based upon this suggested modification is error and must be reversed. In re Bond, 910 F.2d 831, 15 U.S.P.Q.2d (BNA) 1566 (Fed. Cir. 1990).

Applicants submit that the '733 patent is directed to increasing the rate of incorporation of Mn in a phosphating treatment by the application of current. The '733 patent does not address the problem of sludge formation nor does it even recognize the benefit of using nitric acid, instead the '733 opts to use a nitrate salt. There is no teaching or suggestion in '733 of the desirability of or how to create Applicants' composition, accordingly the rejection under 35 USC §103 should be withdrawn.

Claims 1-10, 12-17 and 19-20 were also rejected under 35 USC §103 as being unpatentable over U.S. Patent No. 5,525,431 to Kanamaru et al. (the '431 patent). Kanamura is directed to a pretreatment for sheet steel that is applied before phosphating. In contrast, Applicants' invention is directed to an improved phosphating treatment, which eliminates sludge production. An additional step of a phosphating treatment is required after the invention of the '431 patent is applied to obtain an adequate zinc phosphate layer. Kanamura neither teaches nor suggests a composition or process suitable for making a zinc phosphate coating. The '431 patent teaches:

Hereunder, description is given of the range of film amount of the present invention.

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The amount of the present film must be at least 5 mg/m.² of Mn oxide (in terms of Mn), but when the film amount is larger than 500 mg/m.² it may cause insufficient film formation in the phosphating treatment.

An appropriate film amount, therefore, is not less than 5 mg/m.² and not more than 500 mg/m.² in terms of Mn.

To improve the adhesive property, film forming property, etc. of such films, phosphoric acid and/or boric acid may also be incorporated in the film. In this way, it is recognized that the Mn-base oxide film structure becomes more uniform, the film forming property is improved, the lubricity is improved to enhance the press-formability, and the phosphatability is also improved.

Such oxide film can be prepared, for example, by dipping zinc-base galvanized sheet steel in an aqueous solution containing 1-70 g/l of potassium permanganate, 5-60 g/l of phosphoric acid or boric acid (when the two acids are used together, respectively 5-60 g/l) and 100-800 g/l of zinc nitrate, by subjecting the galvanized sheet steel to a cathode electrolytic treatment in said aqueous solution, or by spraying the aqueous solution onto the galvanized sheet steel, whereby Mn oxide, phosphoric acid and Zn oxide are formed simultaneously.

When the oxide film is formed on the plated sheet steel in the above-mentioned manner, the plating layer and the alloy metals, etc. in the plating layer get mixed into the oxide film as other oxides. The amount of phosphoric acid and/or boric acid in the oxide film is preferably not more than 1,000 mg/m.² (in terms of P and/or B) An amount larger than 1,000 mg/m.² is unpreferable because it may deteriorate the phosphatability. The lower limit is not critical so long as phosphoric acid is contained.

U.S. Patent No. 5,525,431, col. 15, lines 16-50 (emphasis added).

The underlined passages above show that the composition and process of the '431 patent are directed to forming an oxide coating, possibly incorporating some phosphoric acid, not a zinc phosphate coating. The '431 does not recognize the problem of sludge formation or the solution to the problem claimed by Applicants. Furthermore, the ranges taught by the '431 patent do not overlap the ranges claimed in


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indep nd nt claims 1, 12 or 14. Thus, the '431 neither teaches nor sugg sts Applicants' nonsludging phosphating composition nor the desirability of modifying the '431 patent in an attempt to achieve Applicants' invention. Accordingly, the rejection under 35 USC §103 based upon the '431 patent should be withdrawn.

CONCLUSION

Applicant requests reconsideration in view of the amendments and remarks contained herein, a copy of the claims showing the amendments made is attached hereto as an appendix. Applicant submits that the claims are in condition for allowance and a notice to that effect is respectfully requested. Should the Examiner have any questions regarding this paper, please contact the undersigned.

Respectfully submitted,


Mary K. Cameron
(Reg. No. 34,789)
Attorney for Applicants
248-589-4672

Henkel Corporation
Law Department
2500 Renaissance Boulevard, Suite 200
Gulph Mills, PA 19406

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